INTER-OFFICE CORRESPONDENCE

Wacker Silicones Corporation

To S. E. Etter

Copy to J. Barancin
J. Calamungi
B. Dennis
G. Lengnick
M. O'Connor
J. Patzke

Date May 5, 1989

From G. C. Philbrook

Subject Old Drum Site;
Well Sampling

On April 14, 1989, the southeast well (#M4s), which is downstream of the old drum burial site, was sampled.

Table II shows the results, compared to five earlier times. Also attached is an old historical graph with the latest results included, but not to time scale.

There is a downward trend in the contamination.

G. C. Philbrook

Attachment

OLD DRUM SITE Table A

M-4 Shallow Well Analysis Results Comparison

(Nov 1985 Thru April 1989 ~~June~~ 1988)

	CONTAMINANT DETECTED	11-13-85	5-14-86	11-11-86	1-6-87	6-28-88 ~~7-22-88~~	4-14-89	
1	1,1-dichloroethane	50 ppb	95 ppb	45 ppb	25 ppb	18 ppb	4 ppb	
2	t-1,2-dichloroethene	390 "	655 "	320 "	180 "	91 "	46 "	
3	1,1,1-Trichloroethane	1000 "	1305 "	960 "	1130 "	274 "	229 "	
4	Trichloroethylene	920 "	940 "	580 "	640 "	396 "	197 "	
5	Tetrachloroethylene	810 "	760 "	1290 "	1790 "	936 "	787 "	
6	Trimethyl Silanol	~1 ppm	~7 ppm	2 ppm	~4 ppm	~1 ppm	≈ 1.12 ppm	
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								

D DRUM BURIAL SITE

CP DATE 1 SUBJECT 111-4S WELL SHEET NO OF

BY DATE JOB NO.

⊡ SHRADER LAB DATA

⊙ MORE PURGING

4/89

6/88

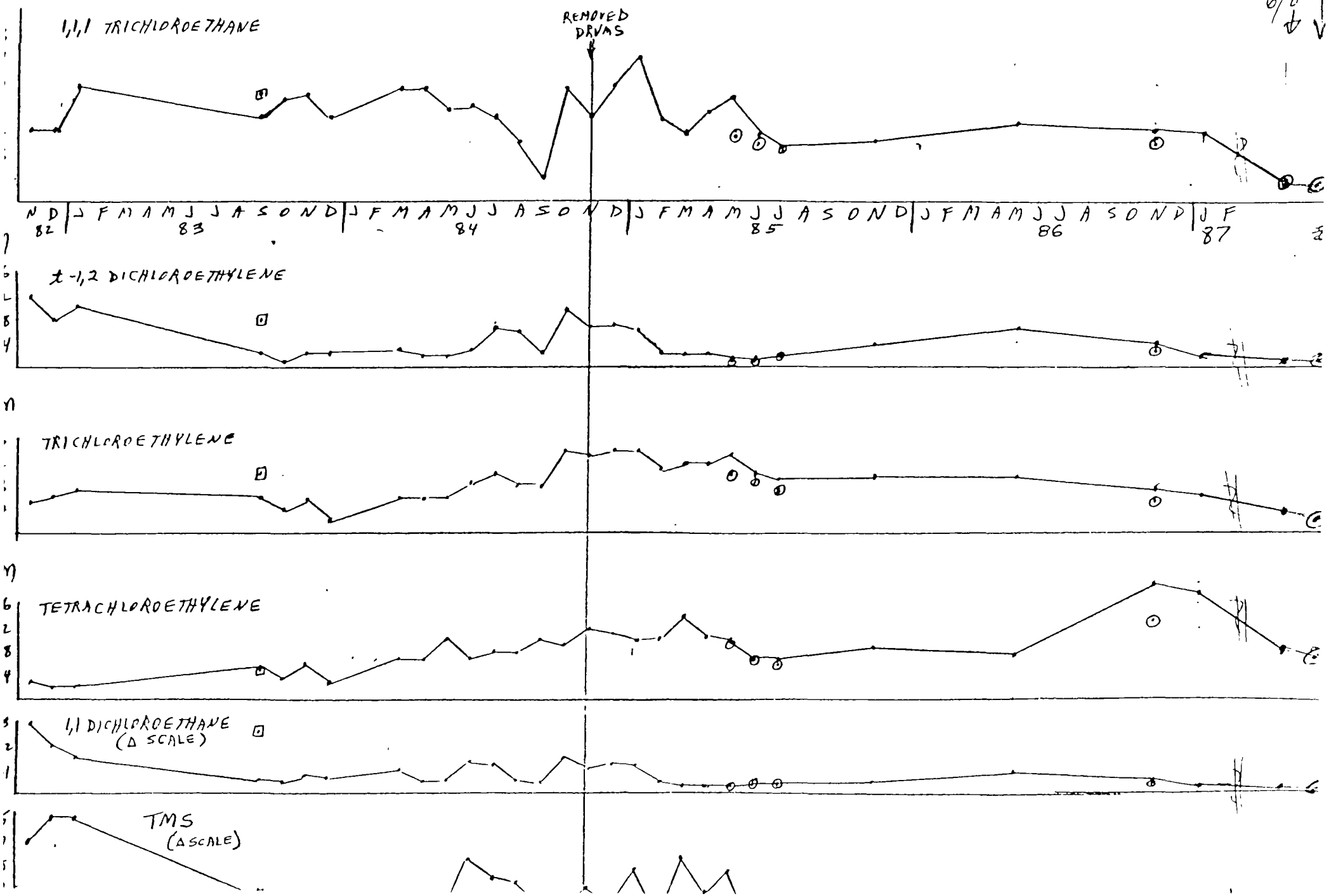


TABLE IID

STAUFFER-WACKER SILICONES CORPORATION

M-4s Well Data, mg/l

	5/14/86	11/11/86	11/11/86[1]	1/6/87[2]
1,1 dichloroethane	0.095	0.050	0.045	0.025
t-1,2 dichloroethylene	0.655	0.400	0.320	0.180
1,1,1 trichloroethane	1.305	1.190	0.960	1.130
trichloroethylene	0.940	0.790	0.580	0.640
tetrachloroethylene	0.760	1.900	1.290	1.790
trimethyl silanol	$\sim$ 7	$\sim$ 3	$\sim$ 2	$\approx$ 4

Note: (1) Sampled after pumping for 7 minutes with Well Wizard pump.

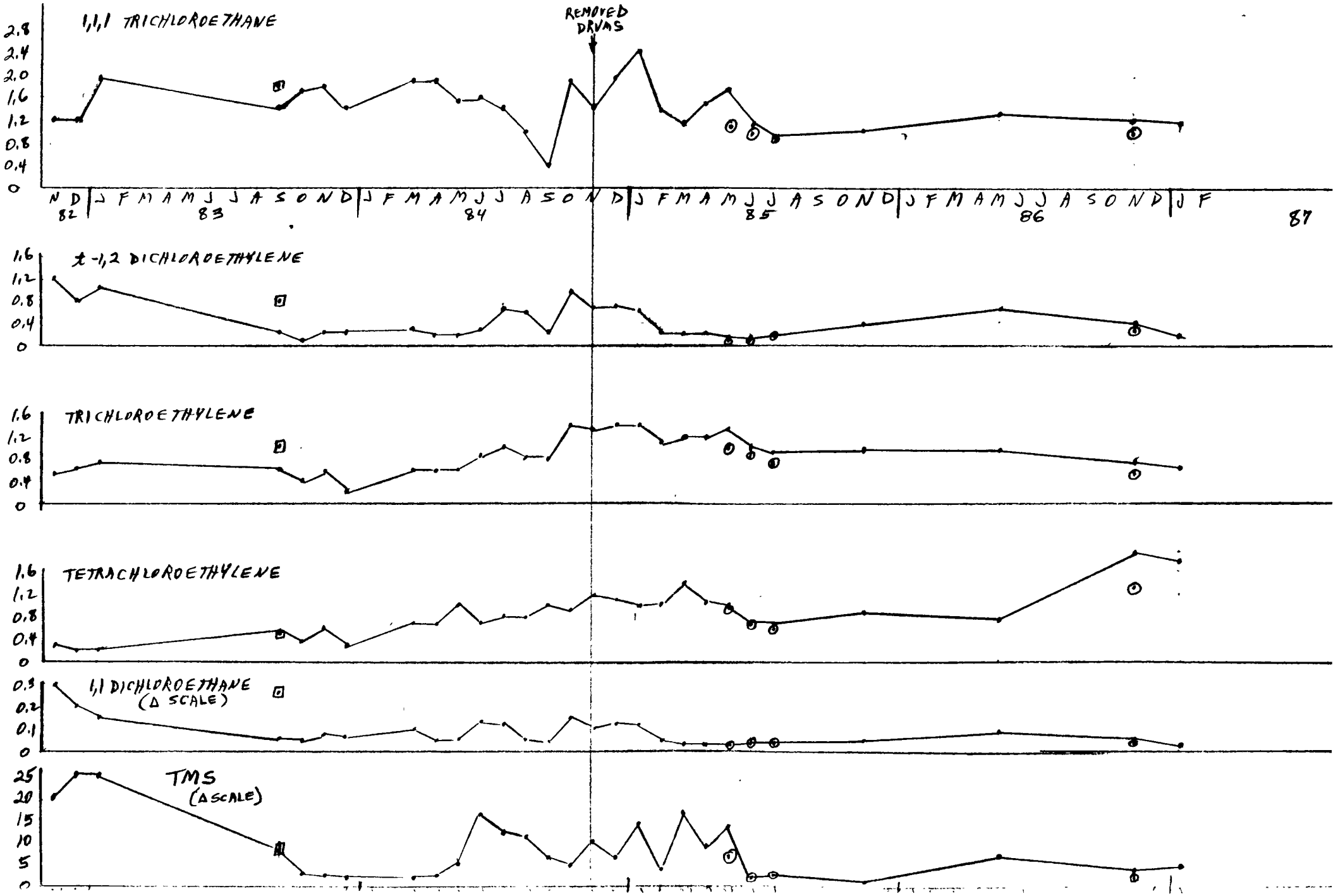
(2) After air-purging 4 times and bailing 20 times.

GCP DATE SUBJECT MW-4S WELL SHEET NO. OF

CD. BY DATE JOB NO.

⊡ SHRADER LAB DATA

⊙ MORE PURGING



INTER-OFFICE CORRESPONDENCE

SWS Silicones Corporation

To J. Calamungi
G. L. Ford
G. F. Lengnick
B. S. McClellan
R. P. Molinelli
T. J. Sayers

Date December 14, 1984

From G. C. Philbrook

Subject OLD DRUM SITE;
SOIL ANALYSES
84-247-GCP

Attached is a summary sheet from the lab of various soil samples, done by DNR water-leachate test.

#1275 Main composite of "140 yd" soil pile, being sent to Chem-Met. Sample taken 11/17/84, about 6:00 p.m.

#1260 & #1261 These were taken right under some drums that had just been removed, when Bob Babcock of Michigan Department of Natural Resources was here. Samples taken on 11/16/84, about 11:15 a.m.

#1345 Taken from "hot spot C" determined by H-NU meter test, after all soil had been removed. Sample taken 12/4/84, about 9:30 a.m. Spot "C" is near southwest corner of trench.

#1346 Taken from "hot spot P" determined by H-NU meter test, after all soil had been removed. Sample taken 12/4/84, about 9:30 a.m. Spot "P" is near northeast corner of trench.

G. C. Philbrook

G. C. Philbrook

pb
attachment

RECEIVED
DEC 17 1984
LAW DEPARTMENT

(G. Philbrook) PURGE & TANK DRAIN EC. PROJECT SOIL ANALYSES 12-10-

	CONTAMINANT INFORMATION				APPROX. AMOUNTS DETECTED IN SOIL LEACHATES [ppb]					Reference DI H, O
	Excavation Area	Design. Tag	Probability		#1275	#1260	#1261	#1345	#1346	
1	~2.0 min.	A	UNKNOWN		Trace	—	—	Trace	2,000 ppb	—
2	~3.8 min.	B	UNKNOWN		10,000 ppb	—	—	—	2,000 ppb	—
3	~5.4 "	C	UNKNOWN		70 "	20 ppb	20 ppb	500 ppb	80 "	50 ppb
4	~8.1 "	D	UNKNOWN		250 "	—	—	—	20 "	—
5	~8.7 "	E	1,1-dichloroEthane		Trace	Trace	Trace	—	—	Trace
6	~9.4 "	F	t-1,2-dichloroEthylene		Trace	—	—	—	—	—
7	~10.2 "	G	UNKNOWN		30 "	—	—	30 ppb	Trace	—
8	~12.6 "	H	1,1,1-TrichloroEthane		15 "	Trace	Trace	Trace	—	—
9	~13.8 "	J	Me_3SiOH		3,500 "	—	40 ppb	100 ppb	1,000 ppb	—
10	~14.6 "	K	UNKNOWN		1,000 "	—	—	—	150 "	—
11	~16.8 "	L	TrichloroEthylene		250 "	Trace	—	—	Trace	—
12	~17.5 "	M	UNKNOWN		200 "	—	—	—	—	—
13	~21.4 "	N	UNKNOWN		30 "	—	—	—	—	—
14	~25.2 "	P	TeTrachloroEthylene		30 "	15 ppb	—	Trace	10 ppb	—
15	~27.1 "	Q	Silicone MM		7,000 "	300 ppb	1,200 ppb	200 ppb	1,000 "	200 ppb
16	~28.8 "	R	UNKNOWN		2,000 "	Trace	—	20 "	300 "	10 ppb
17	~31.5 "	S	UNKNOWN		1,000 "	Trace	—	100 "	500 "	Trace
18	~35.4 "	T	UNKNOWN		100 "	Trace	Trace	Trace	100 "	Trace
19	~38.0 "	X_1	UNKNOWN		2,000 "	Trace	Trace	200 "	1,000 "	Trace
20	~39.5 "	X_2	UNKNOWN		1,000 "	Trace	Trace	200 "	1,000 "	Trace
21										
22			*	#1275 is	DNR-Split Soil Sample of The Pile To be hauled away					
23				#1260 is	The #1 Soil Sample Taken From The Pit on 11-16-84					
24				#1261 is	The #2 Soil Sample Taken From The Pit on 11-16-84					
25				#1345 is	The Soil Sample Taken From Location "C" on 12-4-84					
				#1346 is	The Soil Sample Taken From Location "P" on 12-4-84					

CC: G. Wolf
B. Dennis

DEC 11 1984 DEC 1 . 19

TABLE IA

SWS SILICONES CORPORATION

M-1, M-2 Well Data, mg/l

	Well M-2											
	1/5/83	9/13/83	12/20/83	3/15/84	6/13/84	9/13/84	12/10/84	3/14/85	6/19/85	11/13/85	5/14/86	11/11/86
1,1 dichloroethane	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
t-1,2 dichloroethylene	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,1,1 trichloroethane	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
trichloroethylene	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
tetrachloroethylene	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
trimethyl silanol	0.05	N.D.	N.D.	N.D.	N.D.	N.D.	< 0.10	N.D.	N.D.	N.D.	N.D.	N.D.

Note:
1. All data on M-1 well (west of the old buried drum area) taken in January, September, and December, 1983, as well as March and June, 1984, showed "N.D."; likewise September, 1984; December, 1984; March, 1985, June 1985, July 1985, November, 1985, May 1986, November, 1986
2. M-2 is located south of buried drum area.
3. These two wells are screened 35 to 40 feet deep.
4. N.D. (Not Detected) limit is about 0.01 mg/l on organics and 0.1 mg/l on trimethyl silanol.

TABLE IB

SWS SILICONES CORPORATION

M-3 Well Data, mg/l

	1/5/83	9/13/83	12/21/83	3/15/84	6/13/84	9/13/84	12/10/84	3/14/85	6/19/85	11/13/85	5/14/86	11/11/86
1,1 dichloroethane	N.D.	0.005	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	TR.
t-1,2 dichloroethylene	0.02	0.015	N.D.	N.D.	0.005	0.01	0.01	0.01	0.015	0.005	0.005	N.D.
1,1,1 trichloroethane	N.D.	N.D.	N.D.	N.D.	0.005	N.D.	N.D.	N.D.	N.D.	N.D.	0.005	TR.
trichloroethylene	N.D.	N.D.	N.D.	N.D.	0.005	N.D.	0.01	N.D.	0.010	0.010	0.015	0.010
tetrachloroethylene	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
trimethyl silanol	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.

Note: 1. M-3 is located east of drum area.

2. This well is screened 35 to 40 feet deep.

3. N.D. (Not Detected) limit is about 0.01 mg/l on organics. and 0.1 mg/l on trimethyl silanol.

TABLE IIA

SWS SILICONES CORPORATION

M-4s Well Data, mg/l

	11/16/82	12/9/82	1/5/83	9/13/83	9/27/83[2]	10/12/83	11/16/83	12/20/83
1,1 dichloroethane	0.30	0.20	0.16	0.06	0.27	0.04	0.07	0.06
t-1,2 dichloroethylene	1.20	0.80	1.02	0.22	0.82	0.08	0.20	0.18
1,1,1 trichloroethane	1.20	1.20	1.95	1.40	1.77	1.68	1.80	1.40
trichloroethylene	0.50	0.60	0.74	0.62	0.98	0.40	0.55	0.22
tetrachloroethylene	0.30	0.20	0.18	0.51	0.45	0.35	0.58	0.28
trimethyl silanol	~20	~25	~25	~8	~8	2-3	2-3	2

Note: 1. M-4s well is southeast of the old buried drum area, in the direction of groundwater flow, and is screened 35 to 40 feet deep.

2. Analyses by Shrader Laboratories, except for trimethyl silanol.

TABLE IIB

SWS SILICONES CORPORATION

M-4s Well Data, mg/l

	3/15/84	4/19/84	5/15/84	6/13/84	7/18/84	8/14/84	9/13/84	10/15/84	11/20/84	12/10/84
1,1 dichloroethane	0.10	0.04	0.05	0.13	0.105	0.06	0.04	0.16	0.10	0.11
t-1,2 dichloroethylene	0.30	0.20	0.21	0.26	0.675	0.60	0.26	0.94	0.72	0.75
1,1,1 trichloroethane	1.90	1.87	1.55	1.61	1.430	0.96	0.42	1.90	1.39	1.96
trichloroethylene	0.65	0.60	0.63	0.83	1.000	0.79	0.81	1.40	1.31	1.40
tetrachloroethylene	0.68	0.67	0.95	0.71	0.770	0.81	1.02	0.87	1.18	1.14
trimethyl silanol	2	~3	~5	~16	~12	~11	~ 7	~ 5	~10	~ 7

Note: 1. M-4s well is southeast of the old buried drum area, in the direction of groundwater flow, and is screened 35 to 40 feet deep.

2. The buried drums and two feet of bottom soil were removed during the period of November 14 to November 17, 1984.

TABLE IIC

SWS SILICONES CORPORATION

M-4s Well Data, mg/l

	1/16/85	2/19/85	3/14/85	4/18/85	5/22/85	5/23/85[3]	6/19/85	6/19/85[4]	7/16/85	7/16/85[5]	11/13/85
1,1 dichloroethane	0.11	0.04	0.02	0.02	0.015	0.015	0.035	0.035	0.040	0.040	0.050
t-1,2 dichloroethylene	0.65	0.23	0.18	0.22	0.120	0.085	0.140	0.130	0.240	0.230	0.390
1,1,1 trichloroethane	2.40	1.28	1.17	1.50	1.680	1.110	1.150	0.980	0.880	0.840	1.000
trichloroethylene	1.42	1.11	1.20	1.20	1.315	0.955	0.980	0.810	0.890	0.710	0.920
tetrachloroethylene	1.07	1.07	1.41	1.07	0.945	0.875	0.710	0.710	0.705	0.610	0.810
trimethyl silanol	~14	~4	~16	~9	~13	~7	~2	~2	~3	~3	~1

Note: 1. M-4s well is southeast of the old buried drum area, in the direction of groundwater flow, and is screened 35 to 40 feet deep.

2. The buried drums and two feet of bottom soil were removed during the period of November 14 to November 17, 1984.

3. Sampled after pumping 18 gallons with Well Wizard pump; water level had dropped 10 inches.

4. Sampled after pumping 15 gallons with Well Wizard pump; water level had dropped 5 inches.

5. Sampled after pumping 10 gallons with Well Wizard pump; water level has dropped 6 inches.

TABLE IID

STAUFFER-WACKER SILICONES CORPORATION

M-4s Well Data, mg/l

	5/14/86	11/11/86	11/11/86[1]
1,1 dichloroethane	0.095	0.050	0.045
t-1,2 dichloroethylene	0.655	0.400	0.320
1,1,1 trichloroethane	1.305	1.190	0.960
trichloroethylene	0.940	0.790	0.580
tetrachloroethylene	0.760	1.900	1.290
trimethyl silanol	~ 7	~ 3	~ 2

Note: [1] Sampled after pumping for 7 minutes with Well Wizard pump.

TABLE III

SWS SILICONES CORPORATION

M-4d Well Data, mg/l

	12/21/83	3/15/84	6/13/84	9/13/84	12/10/84	3/14/85	6/19/85	11/13/85	5/14/86	11/11/86
1,1 dichloroethane	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
t-1,2 dichloroethylene	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
1,1,1 trichloroethane	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
trichloroethylene	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
tetrachloroethylene	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
trimethyl silanol	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.

Note: 1. M-4d well is 10 ft. downgradient from M-4s and is screened 66 to 71 feet deep.

2. N.D. (Not Detectable) limit is about 0.01 mg/l on organics and 0.1 mg/l on trimethyl silanol.

TABLE IV

SWS SILICONES CORPORATION

M-5s and M-5D Well Data, mg/l

	Well M-5s
	6/13/84
1,1 dichloroethane	0.060
t-1,2 dichloroethylene	0.550(3)
1,1,1 trichloroethane	0.015
trichloroethylene	N.D.
tetrachloroethylene	N.D.
trimethyl silanol	~8.3

Note: 1. M-5s and M-5d are located about 700 feet from Well M-4 on a SE direction toward the River Raisin, on the lower level, on a dirt road, about 300 feet from the river.
M-5s is about 12 to 15 feet deep.
M-5d is about 30 to 34 feet deep.

2. All data on M-5d; June, 1984 showed "N.D.".

3. May be a different chemical.

GCF DATE ____ SUBJECT 111-4 - WELL ____ SHEET NO ____ OF ____

D. BY ____ DATE ____ JOB NO. ____

⊙ MAR PUMPING

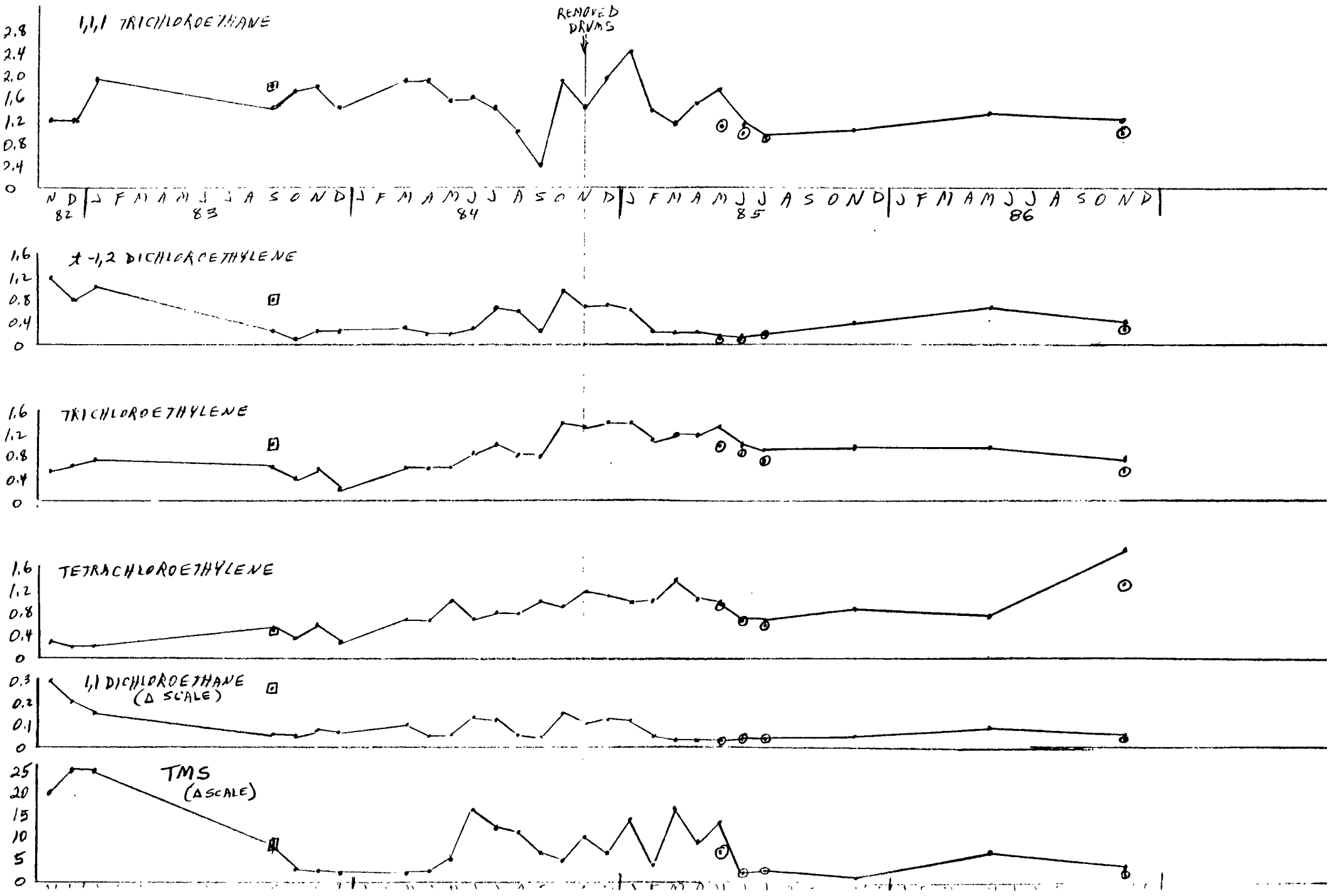


TABLE IC

O-WELL ANALYSES
Summary, ppb
OW-4S

	6/27/80	7/10/80	8/8/80	Shrader 8/8/80	5/7/81	6/9/82(1)	7/21/82(1)	8/11/82(1)	(3)	Shrader 9/29/83	11/18/85
Ethanol(2)											tr
Chloroethane										1569	(2)
Methylene chloride										1277	tr
Acetone				15							110
1,1-dichloroethane				428		N.D.	400	350		2597	350
1,2-dichloroethane				3						47	tr
t-1,2-dichloroethylene				545		800	30	30			tr
1,1,1-trichloroethane	40	N.D.	N.D.	53	N.D.	3000	2500	3600			30
t-amyl alcohol											1630
trichloroethylene				1							N.D.
tetrachloroethylene	N.D.	N.D.	N.D.	8							10
toluene		20	20								tr
MM silicones				52							tr
benzene				8						221	5
1,1,2-trichloroethane											45
trimethylsilanol				>2000							430

(1) Used in mass loading calculation report of December, 1982.
(2) "Ethanol" peak could be chloroethane.
(3) Pond closed August - October, 1982.

Note: "Missing" analyses were probably just not analyzed in the past.

POND

TABLE IA

O-WELL ANALYSES
Summary, ppb
OW-1S

	6/27/80	7/10/80	8/8/80	Shrader 8/8/80	4/15/81	5/7/81	6/9/82[1]	7/21/82[1]	8/11/82[1]	(3)	Shrader 9/29/83	Shrader 9/29/83	11/16/83	11/18/85
Ethanol[2]														6000
Chloroethane											22085	10973		(2)
Methylene chloride											166	197		30
Acetone				247										tr
1,1-dichloroethane				>2000			17000	28000	36000		17494	16322	1600	825
1,2-dichloroethane				64							156	199		45
t-1,2-dichloroethylene				>10000			N.D.	N.D.	N.D.		110		N.D.	tr
1,1,1-trichloroethane	14000	8000	18000	2624	9000	8000	3700	5500	6900		14	31	N.D.	30
t-amyl alcohol														990
trichloroethylene				4									N.D.	N.D.
tetrachloroethylene	340	N.D.	N.D.	13									N.D.	N.D.
toluene		1100	2000	429								33		tr
MM silicones														tr
benzene				113								88	40	25
1,1,2-trichloroethane				27										150
trimethylsilanol				>2000										935

(1) Used in mass loading calculation report of December, 1982.
(2) "Ethanol" peak could be chloroethane.
(3) Pond closed August - October, 1982.

Note: "Missing" analyses were probably just not analyzed in the past.

TABLE ID

O-WELL ANALYSES
Summary, ppb
OW-4d

	6/27/80	7/10/80	8/8/80	4/15/81	6/9/82[1]	7/21/82[1]	8/11/82[1]	(3)	Shrader 9/29/83	11/18/85
Ethanol[2]										N.D.
Chloroethane										(2)
Methylene chloride									57	N.D.
Acetone										tr
1,1-dichloroethane					N.D.	N.D.	N.D.			tr
1,2-dichloroethane										N.D.
t-1,2-dichloroethylene					40	50	160		125	220
1,1,1-trichloroethane	N.D.	N.D.	N.D.	N.D.	80	60	180			35
t-amyl alcohol										N.D.
trichloroethylene									107	300
tetrachloroethylene	190	400	4000						12909	16540
toluene		N.D.	20							30
MM silicones										500
benzene									15	5
1,1,2-trichloroethane										25
1,1,2,2-tetrachloroethane									243	
trimethylsilanol										145

(1) Used in mass loading calculation report of December, 1982.
(2) "Ethanol" peak could be chloroethane.
(3) Pond closed August - October, 1982.

Note: "Missing" analyses were probably just not analyzed in the past.

TABLE IE

SWS SILICONES CORPORATION
EVAPORATION POND MONITORING WELLS
November 8, 1985

	OW-1S	OW-4S	OW-4D	OW-1D
Water level, ft.	15.42	10.50	29.17	Dry
Bottom, ft.	19.17	15.42	39.00	
Water depth, ft.	3.75	4.92	9.83	
Number of bails	16	15	15	
Comments:	Blackish; odor.	Clear; silty.	Clear.	

BY GCP DATE 5/89 SUBJECT SWMU's SHEET NO. OF
CHKD. BY DATE WACKER SILICONES CORP. JOB NO. TABLE I

WMU #	ITEM SWMU	LOCATION	DATE STARTED	DATE CLOSED	CODE	SIZE	CAPACITY	MATERIAL CONSTRUCTION	LINED	SECOND. CONTAINMENT MATERIAL	DESCRIPTION/COMMENTS
1	HW HANDLING; RCRA B PERMIT — T-101	NE PLANT	-/80	—	H	25,000 GAL	15,100 G/YR	C.S.	NO	CONCRETE DIKE, PAD	STORED METHYL CHLORIDE 1964-1975
2	T-105	NE PLANT	-/80	—	H	15,000 GAL	10,000 G/YR	C.S.	NO	" " " "	" TOLUENE 1964- "
3	T-108	NE PLANT	-/80	—	H	15,000 GAL	10,000 G/YR	C.S.	NO	" " " "	" ETHANOL 1964-1972
4	HW PAD	E PLANT	-/80	—	H	43'x 51'	500 DRUMS	CONCRETE	NO	NO	RCRA B STORAGE, DRUMS
5	WASH-WATER TREAT. — T418	POLYMERS	-/80	—	H,C	20,000 GAL	167,000 G/YR	FRP	NO	CONCRETE DIKE, PAD	STORED CRUDE HCl 1973-1976
6	T419	POLYMERS	-/80	—	H,C	20,000 GAL	167,000 G/YR	FRP	NO	" " " "	" " " " " "
7	T417	E. HI-BAY	-/80	—	C	20,000 GAL	200,000 G/YR	FRP	NO	NO	" " " " " " "
8	HI BAY SUMP	S. HI BAY	-/81	—	C	500 GAL	" " " "	CONCRETE	NO	NO	UNDERGROUND; RELOCATED 1989
9	2 RTV SUMPS	W. RTV	-/79	—	C	2 X 1,500 GAL	120,000 GAL/YR	CS	NO	NO	" " " " (+ MANHOLE)
10	T-127A	SE PLANT	-/80	—	C	4,000 GAL	—	FRP	NO	"BLDG" DIKE	ONLY USED OCASSIONALLY
11	T-127B	SE PLANT	-/80	—	C	4,000 GAL	—	FRP	NO	"BLDG" "	" " " "
12	T-126A	SE PLANT	-/80	—	C	400,000 GAL	670,000 G/YR	CS	EPOXY PAINT	BERM DIKE	CONCRETE FOUNDATION WITH LEAK DETECTION PIPES & WITH AERATORS IN TANKS
13	T-126B	SE PLANT	-/80	—	C	400,000 GAL	" " "	CS	" " "	" "	
14	CHEMICAL SEWER — API TK	S PLANT	-/65	—	C	16,000 GAL	45,000,000 G/YR	CONCRETE	NO	NO	W/ OIL-SKIMMER SYSTEM
15	EQUAL. POND	S PLANT	-/75	—	C	85'x 185'; (2,500,000 GAL)	45,000,000 G/YR	—	CLAY	NO	W/ 4 AERATORS IN "N-HALF"
16	COOLING WATER — N CW POND	SE PLANT	-/65	—	—	(120'x 65' 750,000 GAL)	—	—	TAR PAPER, ASPHALT	NO	RELINED W/ RTV II IN 1986
17	S CW POND	SE PLANT	-/65	—	—	(" " " ")	—	—	" " " "	NO	REPAIRED, 1 OR 2 X
18	SPCC POND	S PLANT	-/75	—	—	100'x 250' (750,000 GAL)	5,000,000 G/YR	—	CLAY	NO	STORM WATER RUNOFF
19	NH PAD	PLANT	-/83	—	C	20'x 30'	600 T/YR	CONCRETE	NO	NO	DRUMS ONLY
20	(WAS HW PAD)	PLANT	-/65	-/83	H,C	30'x 30'	800 T/YR	CONCRETE	NO	NO	CLOSED OUT WITH RCRA B PERMIT
21	OLD EVAP. POND	E. PLANT	-/70	-/82	C	100'x 250'	30,000 G/MO.	—	CLAY	NO	CLOSED OUT BY MDNR; 1976-74 LIME SLURRY; 1974-80 WASH WATERS
22	OLD DRUM BURIAL	W. FIELD	-/72	-/84	H,C	25'x 120'	6,600 GAL	—	—	NO	CLOSED OUT BY MDNR; "ONE TIME ONLY" IN 1972
23	RX BED BURIAL	W. FIELD	-/70	-/78	—	200'x 300'	5,100 TONS	—	—	NO	NON-HAZARDOUS LIME SLUDGE AND SPENT RX DUMPINGS

CODE: H = HAZARDOUS WASTE
C = " " CONSTITUENTS

INTER-OFFICE CORRESPONDENCE

SWS Silicones Corporation

To G. C. Philbrook

Date December 2, 1983

Copy to L. B. Bruner
J. Calamungi
B. P. Dennis
G. L. Ford
B. McClellen
T. J. Sayers
G. R. Wolf

From S. L. Compton

Subject SWS TEST WELL WATER RESULTS

E&E on 9/27/83

Six filtered and unfiltered SWS test well water samples, collected on October 14, 1983, were analyzed for the 13 total priority metals. The results are as follows:

Metal mg/l	POND IS Well(U)	POND IS Well(F)	DRUM SITE M-1 Well(U)	DRUM SITE M-1 Well(F)	DRUM SITE M-4 Well(U)	DRUM SITE M-4 Well(F)
1. Antimony	0.05	<0.01	<0.01	<0.01	<0.01	<0.01
2. Arsenic	<0.04	<0.04	<0.004	<0.004	0.004	<0.004
3. Beryllium	0.01	<0.01	<0.01	<0.01	<0.01	0.01
4. Cadmium	0.014	<0.001	0.003	0.004	0.005	<0.001
5. Chromium	0.14	<0.01	<0.01	0.01	<0.01	<0.01
6. Copper	3.69	0.008	0.015	0.015	0.026	0.012
7. Lead	0.24	0.003	0.013	0.002	0.016	0.004
8. Mercury	0.0004	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004
9. Nickel	0.33	0.009	0.006	0.001	0.009	0.007
10. Selenium	<0.02	<0.002	<0.004	<0.004	<0.01	<0.004
11. Silver	0.023	0.006	<0.005	<0.005	<0.005	0.007
12. Thallium	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
13. Zinc	2.13	0.029	0.048	0.026	0.061	0.032

(U) = unfiltered and containing nitric acid preservative
(F) = filtered prior to addition of nitric acid preservative

Analyses clearly indicate a reduction in some of the metal concentrations following sample filtration.

The filtration removes insoluble material. The contamination (insoluble material) results from bailing the wells prior to sampling.

Samuel L. Compton

Samuel L. Compton

SLC:jj

0032-095-02A (2/75)

DEC 6 1983

DRUM SITE

SWS SILICONES CORPORATION
Laboratory Testing - October 14, 1983
JONES & HENRY LABORATORIES, INC.

SWS Sample Identification: 63905 M-1 Well
JHL Sample Number: 8310-206 unfiltered

TEST PARAMETER	CONCENTRATION (mg/l)
Antimony	< 0.01
Arsenic	< 0.004
Beryllium	< 0.01
Cadmium	0.003
Chromium	< 0.01
Copper	0.015
Lead	0.013
Mercury	< 0.0002
Nickel	0.006
Selenium	< 0.004
Silver	< 0.005
Thallium	< 0.1
Zinc	0.048

LT - Actual value less than stated level of detection

Please advise should you have questions concerning these data.

DRUM SITE

SWS SILICONES CORPORATION
Laboratory Testing - October 14, 1983
JONES & HENRY LABORATORIES, INC.

SWS Sample Identification: 63902 M-1 well duplicate
JHL Sample Number: 8310-203 unfiltered

TEST PARAMETER	CONCENTRATION (mg/l)
Antimony	< 0.01
Arsenic	< 0.004
Beryllium	< 0.01
Cadmium	< 0.001
Chromium	< 0.01
Copper	0.016
Lead	0.014
Mercury	< 0.0004
Nickel	0.002
Selenium	< 0.004
Silver	< 0.005
Thallium	< 0.1
Zinc	0.052

LT - Actual value less than stated level of detection

Please advise should you have questions concerning these data.

DRUM SITE

SWS SILICONES CORPORATION
Laboratory Testing - October 14, 1983
JONES & HENRY LABORATORIES, INC.

SWS Sample Identification: 63899 M-1 well
JHL Sample Number: 8310-200 filtered

TEST PARAMETER	CONCENTRATION (mg/l)
Antimony	< 0.01
Arsenic	< 0.004
Beryllium	< 0.01
Cadmium	0.004
Chromium	0.01
Copper	0.015
Lead	0.002
Mercury	< 0.0002
Nickel	0.001
Selenium	< 0.004
Silver	< 0.005
Thallium	< 0.1
Zinc	0.026

LT - Actual value less than stated level of detection

Please advise should you have questions concerning these data.

SWS SILICONES CORPORATION
Laboratory Testing - October 14, 1983
JONES & HENRY LABORATORIES, INC.

SWS Sample Identification: 63897
JHL Sample Number: 8310-198

M-4 Well unfiltered

TEST PARAMETER	CONCENTRATION (mg/l)
Antimony	< 0.01
Arsenic	0.004
Beryllium	< 0.01
Cadmium	0.005
Chromium	< 0.01
Copper	0.026
Lead	0.016
Mercury	< 0.0002
Nickel	0.009
Selenium	< 0.01
Silver	< 0.005
Thallium	< 0.1
Zinc	0.061

LT - Actual value less than stated level of detection

Please advise should you have questions concerning these data.

SWS SILICONES CORPORATION
Laboratory Testing - October 14, 1983
JONES & HENRY LABORATORIES, INC.

SWS Sample Identification: 63904 M-4 Well
JHL Sample Number: 8310-205 Filtered

TEST PARAMETER	CONCENTRATION (mg/l)
Antimony	< 0.01
Arsenic	< 0.004
Beryllium	0.01
Cadmium	< 0.001
Chromium	< 0.01
Copper	0.012
Lead	0.004
Mercury	< 0.0004
Nickel	0.007
Selenium	< 0.004
Silver	0.007
Thallium	< 0.1
Zinc	0.032

LT - Actual value less than stated level of detection

Please advise should you have questions concerning these data.

DRUM

~~DEA~~ UNFILTERED

SWS SILICONES CORPORATION
Laboratory Testing - September 29, 1983
JONES & HENRY LABORATORIES, INC.

M-1 well

SWS Sample Identification: Well 700
JHL Sample Number: 8309-410

TEST PARAMETER	Concentration (mg/l)	
Antimony	LT	0.01
Arsenic	LT	0.002
Beryllium	LT	0.01
Cadmium		0.002
Chromium		0.01
Copper		0.010
Lead		0.007
Mercury	LT	0.0002
Nickel		0.001
Selenium	LT	0.004
Silver	LT	0.005
Thallium	LT	0.1
Zinc		0.060

LT-Actual value less than stated level of detection

Please advise should you have questions concerning these data.

DRUM

UNFILTERED

SWS SILICONES CORPORATION
Laboratory Testing - September 29, 1983
JONES & HENRY LABORATORIES, INC.

M-1 well (duplicate)

SWS Sample Identification: Well 701
JHL Sample Number: 8309-411

TEST PARAMETER	Concentration (mg/l)	
Antimony	LT	0.01
Arsenic	LT	0.002
Beryllium	LT	0.01
Cadmium		0.002
Chromium	LT	0.01
Copper		0.015
Lead		0.008
Mercury	LT	0.0004
Nickel		0.007
Selenium	LT	0.004
Silver	LT	0.005
Thallium	LT	0.1
Zinc		0.064

LT-Actual value less than stated level of detection

Please advise should you have questions concerning these data.

DRUM

UNFILTERED

SWS SILICONES CORPORATION
Laboratory Testing - September 29, 1983
JONES & HENRY LABORATORIES, INC.

M-4 well

SWS Sample Identification: Well 698
JHL Sample Number: 8309-408

TEST PARAMETER	Concentration (mg/l)
Antimony	LT 0.01
Arsenic	0.011
Beryllium	LT 0.01
Cadmium	0.002
Chromium	0.02
Copper	0.017
Lead	0.015
Mercury	LT 0.0002
Nickel	0.012
Selenium	0.009
Silver	LT 0.005
Thallium	LT 0.1
Zinc	0.061

LT-Actual value less than stated level of detection

Please advise should you have questions concerning these data.

DRUM SITE

UNFILTERED

SWS SILICONES CORPORATION
Laboratory Testing - September 29, 1983
JONES & HENRY LABORATORIES, INC.

M-4 well (duplicate)

SWS Sample Identification: Well 699
JHL Sample Number: 8309-409

TEST PARAMETER	Concentration (mg/l)	
Antimony	LT	0.01
Arsenic		0.006
Beryllium	LT	0.01
Cadmium		0.004
Chromium		0.02
Copper		0.019
Lead		0.014
Mercury	LT	0.0002
Nickel		0.011
Selenium	LT	0.004
Silver	LT	0.005
Thallium	LT	0.1
Zinc		0.062

LT-Actual value less than stated level of detection

Please advise should you have questions concerning these data.

INTER-OFFICE CORRESPONDENCE

SWS Silicones Corporation

To G. R. Wolf

Copy to ~~G. C. Philbrook~~

Date August 4, 1982

From B. P. Dennis

Subject EVAPORATION POND

The results from the analysis of the nine Evaporation Pond well samples collected on July 21, 1982 are tabulated below:

WELL NO.	TOC mg/l	Hydrolyzable chloride, mg/l	1,1,1 trichloro-ethane, µg/l	1,1 dichloro-ethane, µg/l	t-1,2-dichloro ethylene, µg/l
1S	900	1600	5500	28000	N.D.
1D	100	1180	120	N.D.	N.D.
	28	410	400	N.D.	650
2D	(No water available for sampling)				
3S	13	400	1000	N.D.	N.D.
3D	7	250	N.D.	N.D.	N.D.
4S	34	1390	2500	400	30
4D	8	235	60	N.D.	50
5	16	370	200	N.D.	250

B. Dennis

B. P. Dennis

BPD:cw

AUG 17 1982

INTER-OFFICE CORRESPONDENCE

SWS Silicones Corporation

To G. R. Wolf

Copy to G. C. Philbrook

Date August 18, 1982

From B. P. Dennis

Subject Well Analysis

The Evaporation Pond monitoring wells were resampled on August 11, 1982 and analyzed for TOC, hydrolyzable chloride and three volatile halogenated organic compounds. The results from these analyses are given below:

WELL NO.	TOC mg/l	Hydrolyzable chloride, mg/l	1,1,1 trichloro-ethane, µg/l	1,1 dichloro-ethane, µg/l	t-1,2-dichloro-ethylene, µg/l
1S	1000	2157	6900	36000	N.D. (<1000)
1D		Insufficient water for sampling			
2S	24	547	610	10	670
2D		Insufficient water for sampling			
3S	14	537	1700	10	10
3D	6	239	N.D.	N.D.	N.D.
4S	360	1978	3600	350	30
4D	11	249	180	N.D.	160
5	18	403	310	N.D.	400

N.D. = None detected. Detection limits 10 µg/l except in 1S where 1,1 dichloroethane peak interferes.

B. P. Dennis

BPD:cw

0032-095-02A (2/78)

AUG 20 1982

INTER-OFFICE CORRESPONDENCE

SWS Silicones Corporation

To G. R. Wolf

Copy to G. C. Philbrook

Date July 19, 1982

From B. P. Dennis

Subject ANALYSIS OF WATER FROM TEST WELLS

The results from the analysis of the test well samples for di-n-butyl phthalate are tabulated below. These samples were collected on June 9, 1982.

WELL NO.	di-n-butyl phthalate, µg/l
1 S	<25
1 D	ND
2 S	ND
2 D	<30
3 S	ND
3 D	<25
4 S	ND
4 D	ND
5	ND

ND = None detected. Detection limits ~20 µg/l

B. P. Dennis

BPD:cw

JUL 21 1982

ORGANIC VOL. RESULTS FROM WELL SAMPLES ANALYSES (JUNE 1982)

Sampled 6-9-82 / Analyzed 6-16/19-82

Analysis Order	WELL	1,1-Dichloroethane	t-1,2-Dichloroethylene	1,2-Dichloroethane	1,1,1-Trichloroethane *	Carbon Tetrachloride	2-Methyl-2-BuOH	Trichloroethylene	Benzene	Toluene	Tetrachloroethylene	Cl^- mg/l	TOC mg/l	dinbutylphthalate, ppb	ppb
12	1 S	17,000	N.D.	200	3,700	700	4,400	N.D.	100	700	N.D.	950	30		<25
13	1 S spiked	18,000 (18,200)	1,600 (1550)	220	5,000 (6,700)	800	5,000	N.D.	110	700	N.D.				
9	1 D	N.D.	N.D.	N.D.	130	N.D.	N.D.	N.D.	N.D.	N.D.	150	855	13		ND
3	2 S	N.D.	740	N.D.	250	N.D.	50	850	N.D.	N.D.	N.D.	440	29		ND
1	2 D	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	240	5		<30
4	3 S	N.D.	N.D.	N.D.	300	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	190	14		ND
2	3 D	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	174	5		<25
11	3 D spiked	210 (250)	360 (310)	N.D.	400 (410)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.				
8	4 S	N.D.	800	15	3,000	1,000	6,500	N.D.	70	N.D.	N.D.	1280	20		ND
7	4 D	N.D.	40	N.D.	80	N.D.	N.D.	100	N.D.	N.D.	3,500	273	8		ND
6	5	N.D.	140	N.D.	250	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	370	14		ND
5	DI BLANK	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D	N.D.	N.D.	N.D.				
10	DI spiked	230 (250)	450 (310)	N.D.	470 (410)	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.				
	FOR STATE DNR →	X	X		X							X	X		X

GROUND WATER FLOW BENEATH THE SEALED EVAPORATION AND SETTLING BASIN AT SWS SILICONES CORPORATION ADRIAN, MICHIGAN

Prepared by:

Commonwealth Associates Inc.
209 East Washington Avenue
Jackson, Michigan
December 13, 1982

Approved by:

Annette Brewster

Annette Brewster
Senior Geologist/Hydrogeologist
Industrial & Environmental Div.

GROUND WATER FLOW BENEATH THE SEALED EVAPORATION AND SETTLING BASIN AT SWS SILICONES CORPORATION ADRIAN, MICHIGAN

INTRODUCTION

During the summer of 1982, SWS Silicones Corporation (SWS) removed from service and sealed over an evaporation and settling basin located in the southeast portion of their plant site near Adrian, Michigan. Commonwealth Associates Inc. (Commonwealth) was retained in October 1982 to determine the quantity of ground water passing beneath the basin. The results of Commonwealth's investigations, analytical procedures and data and assumptions used in the analysis are presented in this letter report.

EXISTING HYDROGEOLOGIC CONDITIONS

Soil Sequence

Logs of the B-series and OW-series borings were reviewed to establish the soil sequence in the vicinity of the evaporation and settling basin. These logs were originally presented in Commonwealth Report R-2194, "Hydrogeologic Study for Evaporation and Settling Basin." Boring locations are shown on Figure 1, Site Topography and Plot Plan, along with the configuration of the evaporation and settling basin before sealing.

Subsurface geologic profiles through the basin area are shown on Figures 2 and 3. To construct the profiles, contour maps were first prepared for the four major soils changes indicated on the boring logs. Profiles of the contacts between soil types were then developed by superimposing the profile lines shown on Figure 1 onto each contour map. The different soil types on the boring logs and profiles are based upon the Unified Soil Classification System, which is described on Figure 4.

In descending order, the soil sequence shown on the profiles consists of an upper sand layer (SW·SM), very fine sand and organic silt (ML), silty clay (CL), a second layer of very fine sand and silt (ML), and a lower layer of sand (SP·SM). The base of the lower sand layer is not shown because the borings were terminated in this layer. All of the layers present in the basin area were assumed to be continuous to the river bluff. The assumed sequence of upper floodplain soils on all three profiles is based upon soils encountered in boring OW-5.

Ground Water Flow Systems

As documented in Commonwealth Report R-2194, two ground water flow systems occur in the upper 40 feet of unconsolidated soils in the vicinity of the evaporation and settling basin. The upper sand (SW·SM) and silt (ML) comprise the shallow aquifer while the lower silt (ML) and sand (SP·SM) comprise the deep aquifer. In the 1980 report, these aquifers were labeled "perched" and "normal," respectively. Soils immediately below the silty clay layer were unsaturated, indicating that the CL layer acts as a confining layer between the two aquifers.

A pair of observation wells was installed at four locations in the basin area during June 1980 to permit periodic measurements of ground water levels in the shallow and deep aquifers. A ninth observation well was installed at the northern edge of floodplain deposits along the River Raisin (Figure 1). Ground water levels recorded for both aquifers are summarized in Table 1.

Ground water contours for the shallow and deep aquifers on October 15, 1982 are shown on Figures 5 and 6, respectively. Flow lines drawn orthogonal to the contours illustrate the direction of ground water flow in each aquifer. Ground water in the shallow aquifer beneath the former evaporation and settling basin is moving to the south and southeast under an average gradient of approximately 0.027 (27 feet in 1,000 feet). Ground water in the deep aquifer, however, is flowing entirely to the

southeast under an average gradient of approximately 0.019. Water table profiles shown on Figures 2 and 3 reflect the water levels measured on October 15, 1982. As shown on Figures 2 and 3, water in the shallow aquifer discharges along the slope from the upland to the floodplain while water in the deep aquifer discharges to the floodplain swamp and the River Raisin.

Based upon contour maps plotted (but not shown here) for July 1, 1980 and May 26, 1982, ground water flow directions in both aquifers have not changed substantially since the observation wells were first installed. In fact, ground water contours for the deep aquifer on July 1, 1980 are virtually identical to those shown on Figure 6. Deep aquifer contours for May 26, 1982 have the same orientation, but reflect water levels 1 to 2 feet higher than those measured on October 15, 1982. The same relationships do not hold, however, for the shallow aquifer. Although the shallow aquifer contours for July 1, 1980 and May 26, 1982 are nearly the same, ground water levels measured on both dates are 3 to 4 feet higher than water levels measured on October 15, 1982. Also, the contours shown on Figure 5 are less strongly curved than those for either of the previous dates.

Soil Permeabilities

Permeability values to be used in calculating discharge from the shallow and deep aquifers were established from field permeability tests conducted by Commonwealth in six observation wells around the evaporation and settling basin. Permeability test results were summarized in a previous letter report dated October 14, 1982.

Recommended permeability values for the upper sand (SW·SM) and lower sand (SP·SM) layers are 2.0×10^{-2} cm/sec and 3.0×10^{-3} cm/sec, respectively. These values correspond to 57 ft/day for the upper sand and 8.5 ft/day for the lower sand. Based upon the test results for well OW-3s, the permeability of the sandy silt (ML) is 2.5×10^{-3} cm/sec (7.1 ft/day). This well is screened entirely within the upper ML layer. Since the silt (ML) layer of the deep aquifer was not tested, the permeability is assumed to be the same as for the upper ML layer.

DISCHARGE ANALYSES

Theoretical Basis

Commonwealth was requested to calculate the quantity of ground water reaching the River Raisin or adjacent swamp that also passes beneath the sealed evaporation and settling basin. The computations described herein are based upon ground water flow (potential) theory and the law of mass conservation.

According to the theory of ground water flow, lines drawn orthogonal to equipotential lines (ground water contours) represent impermeable boundaries across which flow does not occur. The area between any two flow lines is called a flow channel. By the law of mass conservation, the quantity of ground water moving in any particular flow channel must be constant unless water is added from an outside source (recharge) or is removed from the flow channel (discharge). For these calculations, it was assumed that there is no recharge to or discharge from either the shallow or deep aquifer in the basin area. This is a reasonable assumption because the cooling lagoons south of the evaporation and settling basin are fully lined.

Analytical Procedures

On Figures 5 and 6, the outer flow lines for each aquifer have been drawn to encompass the evaporation and settling basin in a single flow channel. The quantity of water reaching the bluff or swamp that also passes beneath the basin may be calculated from the relation

$$Q = KiA \qquad \text{(Equation 1)}$$

In this form of Darcy's law, Q is the discharge rate in cubic feet per day (ft^3day), K is the hydraulic conductivity (permeability) of the saturated materials in ft/day, i is the dimensionless hydraulic gradient,

and A is the cross-sectional area normal to the direction of flow. The parameter A may also be written

$$A = mL \qquad \text{(Equation 2)}$$

where m is the saturated thickness of the aquifer and L is the length of any equipotential line between the outer flow lines. Both m and L are in feet (ft).

It was previously established that, in the absence of recharge or discharge, the discharge rate, Q, is constant throughout the length of any flow channel. Therefore, Q will be the same whether it is calculated at the bluff or the edge of the evaporation and settling basin. An arbitrary equipotential line between the outer flow lines and tangent to the southeast corner of the former basin was selected as the line across which the discharge rate would be calculated for each aquifer. This equipotential is indicated on Figures 5 and 6 by a heavy dashed line. Values of k, m, and i are relatively well known at these locations.

As indicated by the geologic profiles and water level measurements in the observation wells, ground water is moving through both the sand and silt layers in each aquifer. Total aquifer discharge, Q_T, is the sum of discharge through the sand layer, Q_{sd}, and discharge through the silt layer, Q_{st},

$$Q_T = Q_{sd} + Q_{st} \qquad \text{(Equation 3)}$$

Darcy's law applied to each layer yields

$$Q_{sd} = (K_{sd})(m_{sd})iL \text{ and} \qquad \text{(Equation 4A)}$$

$$Q_{st} = (K_{st})(m_{st})\ iL \qquad \text{(Equation 4B)}$$

Substituting Equations 4A and 4B into Equation 3 results in

$$Q_T = [(K_{sd})(m_{sd}) + (K_{st})(m_{st})]iL \qquad \text{(Equation 5)}$$

Calculations

Permeability and hydraulic conductivity values to be used in the discharge calculations are provided earlier in this report. The parameter L is the length of the dashed equipotential line shown on Figures 5 and 6. L is 300 feet for the shallow aquifer and 279 feet for the deep aquifer.

A three-step process was used to establish the saturated thicknesses, m, of all layers except the lower sand. First, profile lines A-A', B-B', and C-C' (Figure 1) were superimposed on the ground water contour maps to locate the point where the dashed equipotential line crosses the profile lines. Next, the saturated thicknesses at that point were determined from the profiles. On October 15, 1982, the saturated thickness ranged from 0.0 to 0.5 ft for the upper sand, 2.5 to 8.5 ft for the upper silt, and 5.0 to 6.0 ft for the lower silt. Finally, values of m were averaged for each layer to obtain a single value for use in the calculations.

The saturated thickness of the lower sand cannot be determined from existing data. A value may be estimated, however, based upon an understanding of ground water flow theory. According to the theory, vertical (upward) components of flow associated with discharge areas would prevent convective mixing of ground water between the upper and lower portions of the aquifer. Available data indicate that ground water in the deep aquifer is discharging to the floodplain swamp and River Raisin. Therefore, the effective saturated thickness for computing the quantity of ground water affected by the evaporation and settling basin would be less than the total saturated thickness of the aquifer. An effective saturated thickness of 3 feet has been assumed for the lower sand. If a different value can be shown to be more appropriate, the daily discharge from the deep aquifer can be readily computed by substituting the new value for m_{sd} into Equation 5.

For the shallow aquifer, the discharge rate from the flow channel shown on Figure 5 was calculated using the following values for K, m, i, and L:

K_{sd} = 57 ft/day K_{st} = 7.1 ft/day

m_{sd} = 0.2 ft m_{st} = 6.2 ft

i = 0.027 L = 300 ft

Substitution of these values into Equation 5 yields

$$Q_T = 449 \text{ ft}^3/\text{day} \text{ (3359 gallons/day)}$$

for the shallow aquifer.

Values of k, m, i, and L used in calculating the discharge rate from the flow channel shown on Figure 6 were:

K_{st} = 7.1 ft/day K_{sd} = 8.5 ft/day

m_{st} = 5.5 ft m_{sd} = 3.0 ft

i = 0.019 L = 279 ft

Substitution of these values into Equation 5 yields

$$Q = 342 \text{ ft}^3/\text{day} \text{ (2558 gallons/day)}$$

for the deep aquifer.

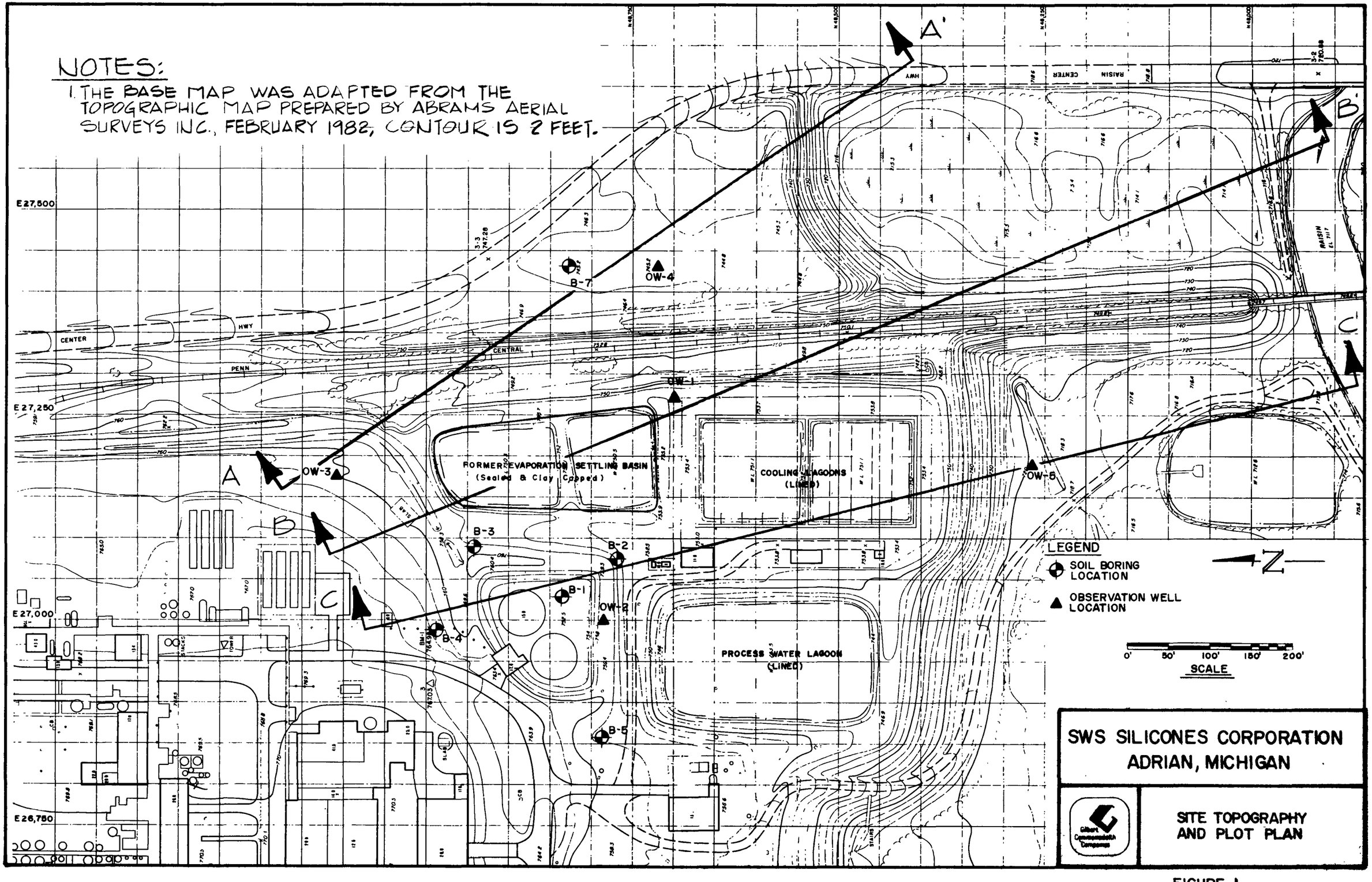
TABLE 1

SUMMARY OF RECORDED WATER LEVELS
FOR THE SHALLOW AND DEEP AQUIFERS

	Well No.	7/1/80	8/80	5/26/82	6/8/82	8/11/82	10/15/82	11/18/82
Shallow Aquifer	OW-1s	741.6	741.9	741.7	741.0	739.3	738.3	739.1
	OW-2s	743.2	742.9	742.8	742.8	741.8	740.8	741.1
	OW-3s	753.0	752.7	752.6	752.6	750.9	750.2	751.2
	OW-4s	739.7	739.3	740.3	739.1	737.0	735.9	737.3
Deep Aquifer	OW-1d	720.2	720.2	722.0	721.2	720.6	720.4	720.3
	OW-2d	725.8	725.9	727.1	727.1	727.4	725.9	726.6
	OW-3d	726.7	726.5	728.4	728.4	727.2	727.3	727.5
	OW-4d	718.6	718.7	720.1	719.5	718.5	718.6	719.0
	OW-5	715.9	716.4	717.3	717.0	715.4	715.8	716.5

NOTES:

1. THE BASE MAP WAS ADAPTED FROM THE TOPOGRAPHIC MAP PREPARED BY ABRAMS AERIAL SURVEYS INC., FEBRUARY 1982, CONTOUR IS 2 FEET.

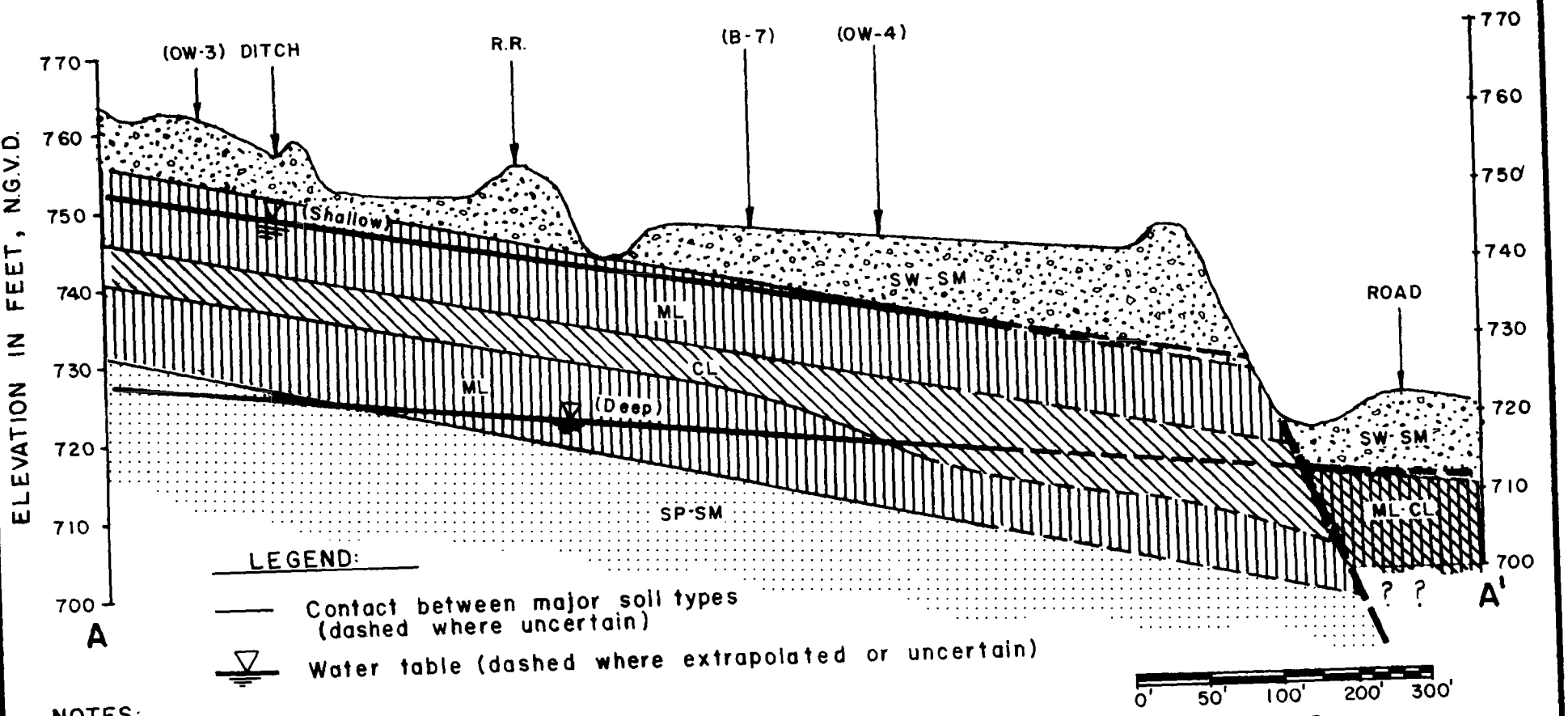


SWS SILICONES CORPORATION
ADRIAN, MICHIGAN

Gilbert Commonwealth Companies

SITE TOPOGRAPHY AND PLOT PLAN

FIGURE 1



NOTES:

1.) Profile locations are shown on Figure 1.

2.) Soil borings projected to the profile line are enclosed in parentheses.

3.) Abbreviations for general soil types shown on the profile are described on Figure 4.

4.) Water table profiles are based upon water levels measured in the shallow and deep wells on October 15, 1982.

SWS SILICONES CORPORATION
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GEOLOGIC PROFILE A-A'

FIGURE 2

NOTES:

1. ELEVATIONS ARE REFERENCED TO THE PLANT MONUMENT
2. GROUND WATER FLOW LINES ARE DRAWN PERPENDICULAR TO THE GROUND WATER CONTOURS
3. THE BASE MAP WAS ADAPTED FROM THE TOPOGRAPHIC MAP PREPARED BY ABRAMS AERIAL SURVEYS INC. FEBRUARY 1982. CONTOUR INTERVAL IS TWO FEET.
4. HEAVY DASHED LINE INDICATES LOCATION OF CROSS-SECTION USED IN DISCHARGE CALCULATIONS. SEE TEXT FOR EXPLANATION.

ZONE OF DISCHARGE

OW-4 718.6

OW-1 720.4

OW-3 727.3

OW-5 715.8

OW-2 725.9

B-7

B-3

B-2

B-1

B-4

B-5

FORMER EVAPORATION & SETTLING BASIN (Sealed & Clay Capped)

COOLING LAGOONS (LINED)

PROCESS WATER LAGOON (LINED)

714

716

718

720

722

724

726

CENTER HWY

PENN CENTRAL

RAISIN CENTER HWY

RAISIN RIVER EL. 717

E 27,600

E 27,200

E 27,000

E 26,780

LEGEND

SOIL BORING LOCATION

OBSERVATION WELL LOCATION

N

0' 50' 100' 150' 200'

SCALE

SWS SILICONES CORPORATION
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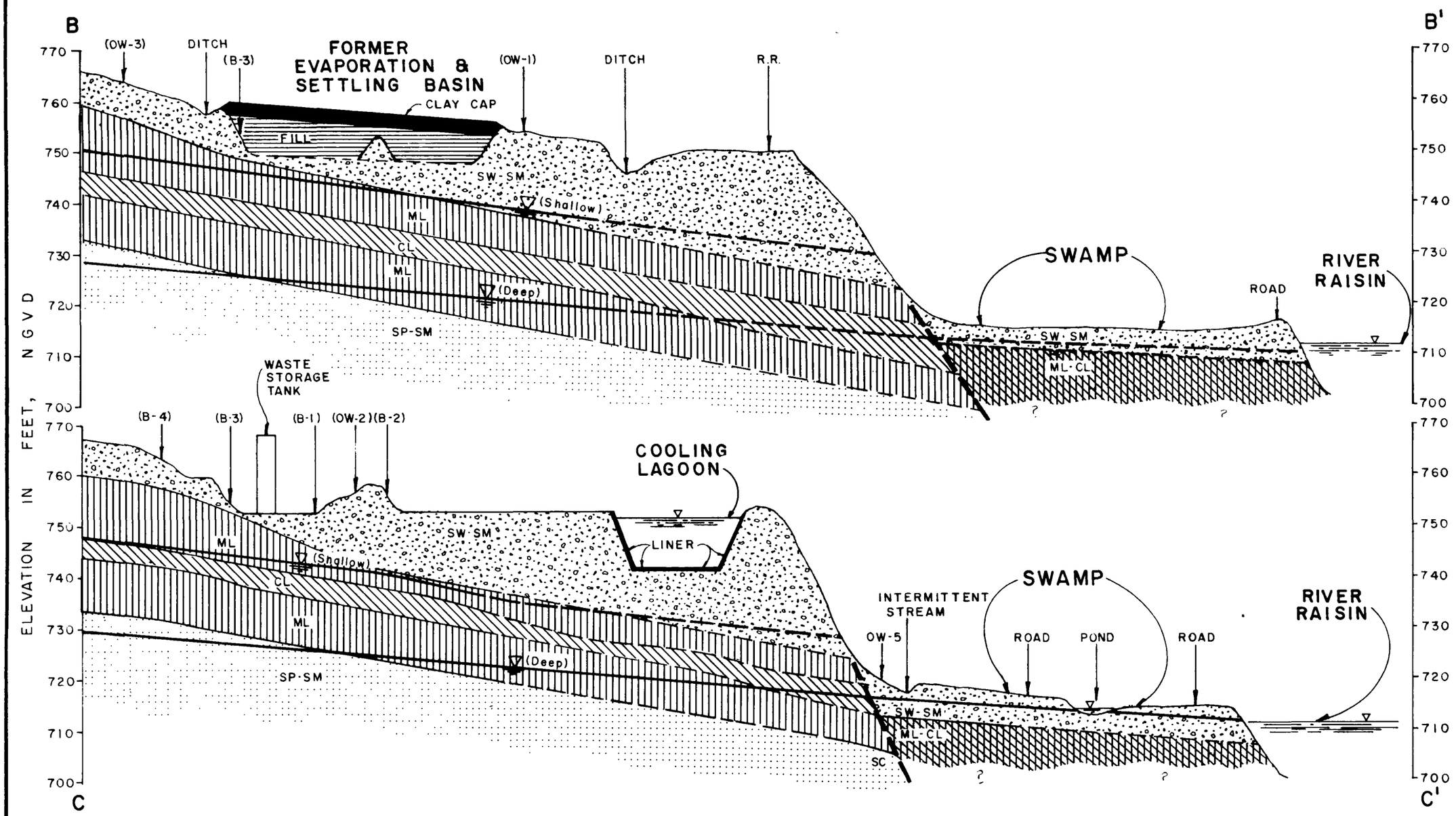
Gilbert Commonwealth Companies

GROUND WATER CONTOURS FOR THE DEEP AQUIFER OCTOBER 15, 1982

FIGURE 6



NOTE:

1.) The legend and notes for these profiles are given on Figure 2.

(Vertical Exaggeration: Approx. 5X)

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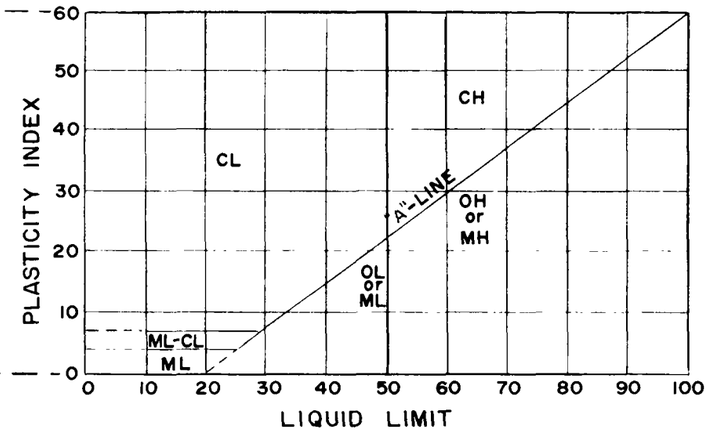
GEOLOGIC PROFILES B-B' AND C-C'

FIGURE 3

MAJOR DIVISIONS			GRAPH SYMBOL	LETTER SYMBOL	TYPICAL DESCRIPTION
COARSE GRAINED SOILS MORE THAN 50 % OF MATERIAL IS LARGER THAN NO. 200 SIEVE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE.	CLEAN GRAVEL (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING NO. 4 SIEVE.	CLEAN SAND (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND-SILT MIXTURES
				SC	CLAYEY SANDS, SAND CLAY MIXTURES.
FINE GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE.	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY.
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS.
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY.
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS.
				CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS.
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS.
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS.

GRAPH SYMBOL	LETTER SYMBOL	ROCK CLASSIFICATION
	SH	SHALE
	SI	SILTSTONE
	SS	SANDSTONE
	LS	LIMESTONE

PLASTICITY CHART



SWS SILICONES CORPORATION
ADRIAN , MICHIGAN

Gilbert Commonwealth Companies

CLASSIFICATION CHARTS

FIGURE 4

NOTES:

1. ELEVATIONS ARE REFERENCED TO THE PLANT MONUMENT.
2. GROUND WATER FLOW LINES ARE DRAWN PERPENDICULAR TO THE GROUND WATER CONTOURS
3. THE BASE MAP WAS ADAPTED FROM THE TOPOGRAPHIC MAP PREPARED BY ABRAMS AERIAL SURVEYS INC., FEBRUARY 1982. CONTOUR INTERVAL IS TWO FEET.
4. HEAVY DASHED LINE INDICATES LOCATION OF CROSS-SECTION USED IN DISCHARGE CALCULATION. SEE TEXT FOR EXPLANATION.

ZONES OF DISCHARGE

N48,750 N48,500 N48,250 N48,000

E27,500 E27,250 E27,000 E26,750

HWY CENTER RAISIN RIVER PENN CENTRAL

B-1 B-2 B-3 B-4 B-5 B-6

OW-1 738.3 OW-2 740.8 OW-3 750.2 OW-4 735.4 OW-5 OW-6

736 738 740 742 744 746 748 750

FORMER EVAPORATION & SETTLING BASIN (Sealed & Clay Capped)

COOLING LAGOONS (LINED)

PROCESS WATER LAGOON (LINED)

LEGEND

- SOIL BORING LOCATION
- OBSERVATION WELL LOCATION

N

0' 50' 100' 150' 200'

SCALE

SWS SILICONES CORPORATION
ADRIAN, MICHIGAN

Gilbert Commonwealth Companies

GROUND WATER CONTOURS FOR THE SHALLOW AQUIFER OCTOBER 15, 1982

FIGURE 5

OLD POND

SHRADER
ANALYTICAL AND CONSULTING LABORATORIES INC.

• Mass Spectrometry • Gas Chromatography • Supporting Services

REPORT OF ANALYTICAL SERVICES

SUBMITTED TO :

SWS SILICONES CORPORATION
SUTTON ROAD
ADRIAN, MICHIGAN 49221

ATTN: MR. BURT DENNIS

We are pleased to provide the enclosed analytical results for the following sample(s). Should you have any questions regarding the methods and/or results, please feel free to write or call.

Customer sample : 63690 - 63704

SL # : 9257 - 9271

Sample description : WATER

Analysis requested : GC/MS

Date received : 29-SEPTEMBER-83

Date completed : 17-OCTOBER-83

Report date : 18-OCTOBER-83

Approved _____ Analyst _____
John A. Defever Maria L. Ordinario

Enclosure(s)

-Continued-

Analytical Procedures

The water samples were analyzed by EPA methods 624 and 625 for volatile and semi-volatile priority pollutants. Included with the samples was a laboratory blank spiked with 2,4,5-trichlorophenol and 1,2,4,5-tetrachlorobenzene at concentrations of 80 and 20 micrograms per liter, respectively.

Results

Summary of the results are tabulated below.

I. VOLATILE PRIORITY POLLUTANTS

SAMPLE	COMPOUND	CONC(µgr/L)
63690	chloroethane	22084.9
(SL #9257)	1,1-dichloroethane	17494.4
15	1,2-dichloroethane	155.9
	methylene chloride	166.2
	1,2-trans-dichloroethylene	108.8
	1,1,1-trichloroethane	13.6
63691	benzene	88.0
(SL #9258)	chloroethane	10973.2
15 (duplicate)	1,1-dichloroethane	16321.6
	1,2-dichloroethane	198.9
	methylene chloride	197.2
	toluene	33.0
	1,1,1-trichloroethane	30.5
63693	chloroethane	84.9
(SL #9260)	1,1-dichloroethane	47.0
35	methylene chloride	8.1
	tetrachloroethylene	10.3
	toluene	23.5

-Continued-

I. VOLATILE PRIORITY POLLUTANTS (con'd)

SAMPLE	COMPOUND	CONC(µgr/L)	
63694 (SL #9261) 3D	toluene	11.1	
			Spike
63695 (SL #9262) 3D (Spiked)	methylene chloride	54.4	
	tetrachloroethylene	272.1	700
	1,2-trans-dichloroethylene	606.6	470
	1,1,1-trichloroethane	382.6	1030
	trichloroethylene	427.9	360
			620 MM
63696 (SL #9263) 4S	benzene	220.5	
	chloroethane	1569.0	
	1,1-dichloroethane	2596.9	
	1,2-dichloroethane	47.0	
	methylene chloride	1276.9	
63697 (SL #9264) 4D	benzene	15.3	
	methylene chloride	56.9	
	1,1,2,2-tetrachloroethane	242.5	
	tetrachloroethylene	12909.1	
	1,2-trans-dichloroethylene	125.3	
	trichloroethylene	106.8	
63698 (SL #9265) MH	chloroform	101.5	
	1,1-dichloroethane	320.0	
	tetrachloroethylene	577.7	
	1,2-trans-dichloroethylene	763.2	
	1,1,1-trichloroethane	1961.1	
	trichloroethylene	684.1	
63699 (SL #9266) MH (Duplicate)	chloroform	78.2	
	1,1-dichloroethane	216.1	
	tetrachloroethylene	327.3	
	1,2-trans-dichloroethylene	871.4	
	1,1,1-trichloroethane	1575.4	
	trichloroethylene	1282.7	

-Continued-

I. VOLATILE PRIORITY POLLUTANTS (con'd)

SAMPLE	COMPOUND	CONC(µgr/L)
63700 (SL #9267) M1	methylene chloride	1866.5
63701 (SL #9268) M1 (Duplicate)	methylene chloride	2059.6
63702 (SL #9269) Dist H2O (Trip.)	none detected	----
63703 (SL #9270) Dist H2O (Bailer Rinse)	none detected	----
63704 (SL #9271) 63703+spike	tetrachloroethylene	301.0 — 80 (Spike)
	1,2-trans-dichloroethylene	84.9 — 50
	1,1,1-trichloroethane	97.7 — 115
	trichloroethylene	46.2 — 40 70 MM
LAB BLANK DI H2O	none detected	----

II. BASE/NEUTRALS and ACIDS PRIORITY POLLUTANTS

SAMPLE	COMPOUND	CONC(µgr/L)
EXTRACTED BLANK(spiked)	2,4,5-trichlorophenol	66.9
	1,2,4,5-tetrachlorobenzene	10.0
	diethyl phthalate	19.4
63690 (SL #9257) I5	phenol	20.0
	bis(2-chloroethyl)ether	9.7
63691 (SL #9258) I5 (duplicate)	phenol	26.2
	dimethyl phthalate	2.2

-Continued-

II. BASE/NEUTRALS and ACIDS PRIORITY POLLUTANTS (con'd)

SAMPLE	COMPOUND	CONC(µgr/L)		Spike
63692	phenol	173.5	-	380
(SL #9259)	dimethyl phthalate	1.7		
1S(spiked)	di-n-butyl phthalate	126.5		415
	naphthalene	342.9	-	390
	nitrobenzene	418.0	-	570
				5ND 1,2,4 Trichlorobenzene
63693	bis(2-ethylhexyl)phthalate	4.1		
(SL #9260)	diethyl phthalate	52.1		
3S	di-n-butyl phthalate	9.5		
	naphthalene	4.4		
	nitrobenzene	1.7		
	1,2,4-trichlorobenzene	2.8		
63694	bis(2-ethylhexyl)phthalate	38.0		
(SL #9261)	diethyl phthalate	62.9		
3D	di-n-butyl phthalate	10.1		
				Spike
63695	phenol	53.8		410
(SL #9262)	di-n-butyl phthalate	55.4	-	235
3D(spiked)	naphthalene	108.1	-	220
	nitrobenzene	395.8	-	320
	1,2,4-trichlorobenzene	97.6	-	305
63696	bis(2-ethylhexyl)phthalate	7.5		
(SL #9263)	di-n-butyl phthalate	3.3		
4S				
63697	bis(2-ethylhexyl)phthalate	2.2		
(SL #9264)	naphthalene	2.2		
4D				
63698	bis(2-ethylhexyl)phthalate	4.9		
(SL #9265)	di-n-butyl phthalate	3.6		
M4				
63699	diethyl phthalate	44.1		
(SL #9266)	di-n-butyl phthalate	5.9		
M4(duplicate)				

-Continued-

II. BASE/NEUTRALS and ACIDS PRIORITY POLLUTANTS (con'd)

SAMPLE	COMPOUND	CONC(µgr/L)
63700 (SL #9267) MI	diethyl phthalate	115.4
	di-n-butyl phthalate	6.3
63701 (SL #9268) MI (duplicate)	none detected	----
63702 (SL #9269) Dist. H_2O (Kroger)	diethyl phthalate	56.4
	di-n-butyl phthalate	11.9

Conclusion

Enclosed are the quantitation summaries for all samples and plots of total ion chromatograms. 1,2,4,5-tetrachlorobenzene spiked onto the laboratory blank was quantitated based on 1,2,4-trichlorobenzene in base/neutral #3 standard. Recoveries for the two compounds spiked onto the blank are:

2,4,5-trichlorophenol - 84%

1,2,4,5-tetrachlorobenzene - 50%

MLO/kal

SHRADER
ANALYTICAL AND CONSULTING
LABORATORIES INC.
• Mass Spectrometry • Gas Chromatography • Supporting Services

SUBMITTED TO:

SWS SILICONES CORPORATION
Sutton Road
Adrian, Michigan 49221

Attn: Mr. Burt Dennis

We are pleased to provide the enclosed analytical results for the following sample(s). Should you have any questions regarding the methods and/or results, please feel free to write or call.

Customer sample: WELL 4S(47167), WELL 1S(47161), WELL 1D(47162)

SA : # 5221 - 5223

Sample Description: Contaminated Water Samples

Analysis Requested: GC/MS

Date Completed: August 27, 1980

Report Date: August 28, 1980

Approved _____ Signed _____
John Defever-Lab Manager Stephen Shrader-Ph.D.

Enclosure(s)

ANALYTICAL PROCEDURES

The three water samples were analyzed by EPA-accepted purge and trap GC/MS methods. Chromatography was performed using a 6' 0.2% Carbowax 1500 on Carbopak C column, temperature programmed from ambient to 200°C at 8°/minute. Mass spectra were recorded at intervals of 6 seconds during the entire analysis.

Qualitative identifications were made by comparison of the mass spectra with reference spectra.

Quantitation was accomplished, where possible, by comparison of the response of compounds in the samples with the response from standard injections. For some compounds, indicated by *, quantitation is only approximate, and is based on total ion current response. A few compounds, indicated by ǂ, overloaded the instrument detector, and are therefore present in concentrations greater than that indicated.

Chromatograms and mass spectra are enclosed.

RESULTS

WELL4S

Scan	Ions	Compound	Concentration
28	58, 43	acetone	15
42	98, 63	1,1-dichloroethane	428 ppb
43	72, 71, 42, 41	tetrahydrofuran	400 ppb*
45	96, 61	t-1,2-dichloroethylene	545
48	84	$CDCl_3$(int. std.)	200 ppb
48	83	chloroform	6
52	62	t-1,2-dichloroethane	3
59	117, 97	1,1,1-trichloroethane	53
60	88, 58	dioxane	100 ppb*
61	75	trimethylsiloxane	>2 ppmǂ
65	83	bromodichloromethane	3
71	73, 59, 55, 31	2-methyl-2-butanol	600 ppb*

WELL4S (con't)

Scan	Ions	Compound	Concentration
77	130, 95	trichloroethylene	1
80	78	benzene	8
90	57, 43	hydrocarbon?	10*
96	87, 69, 59	2,3-dimethyl-2-butanol	50*
116	166, 131	tetrachloroethylene	8
123	92, 91	toluene	52
132	112	chlorobenzene	1

WELL IS

Scan	Ions	Compound	Concentration
27	58, 43	acetone	247
31	59, 45	isopropanol	250*
35	74, 59, 43	methyl acetate	200*
41	98, 63	1,1-dichloroethane	>2 ppm‡
42	72, 71, 42, 41	tetrahydrofuran	200*
45	96, 61	t-1,2-dichloroethylene	>10 ppm‡
47	84	$CDCl_3$(int. std.)	200
51	72, 57, 43 also: 62	methyl ethyl ketone 1,2-dichloroethane	231 64
56	73, 59, 45	2-butanol	200 ppb*
58	117, 97	1,1,1-trichloroethane	2624
59	88, 58 also: 119	dioxane carbon tetrachloride	500* 46
60	75	trimethylsilanol	>2 ppm‡
64	83	bromodichloromethane	147
65	83, 69, 43	2-methyl-3-butyn-2-ol	1 ppm*
73	73, 59, 55, 43, 41	2-methyl-2-butanol	>2 ppm*
77	130, 95	trichloroethylene	4
79	78	benzene	113
81	97, 83	1,1,2-trichloroethane	27
98	59, 45	?	30*

WELL IS (con't)

Scan	Ions	Compound	Concentration
115	166, 131	tetrachloroethylene	13
122	92, 91	toluene	429
133	149, 133, 75	pentamethyldisilanol	100*
148	106, 91	ethyl benzene	10

WELL ID

Scan	Ions	Compound	Concentration
30	58, 43	acetone	16
46	72, 71, 42, 41	tetrahydrofuran	200*
48	96, 61	t-1,2-dichloroethylene	6154 ppb
51	84 also: 83	$CDCl_3$(int. std.) chloroform	200 8
56	72, 57, 43	methyl ethyl ketone	138
64	97	1,1,1-trichloroethane	2
65	78, 58	dioxane	100*
68	75	trimethylsilanol	200*
77	73, 59, 55	2-methyl-2-butanol	20*
83	130, 95	trichloroethylene	265
85	78	benzene	9
120	166, 131	tetrachloroethylene	>3 ppm*
129	92, 91	toluene	113
157	106, 91	ethyl benzene	1

CONCLUSION

Samples WELL4S, WELL IS, and WELL ID are highly contaminated with volatile organic compounds. Many of these compounds are on the EPA priority pollutant list. Others, though not on the list, can also be expected to be toxic.

Initialed: 

SS/kal

SWS SILICONES CORPORATION

RIVER WATER ANALYSIS

On August 25, 1983 water samples were collected at three different locations on the Raisin River south of SWS Silicones Corporation. The results from the analysis of these samples are as follows:

mg/l

	Raisin Hwy. Bridge (Upstream)	South of the Electrical Substation	Wilmoth Hwy. Bridge (Downstream)
1,1 dichloroethane	N.D.	N.D.	N.D.
t-1,2 dichloroethylene	N.D.	N.D.	N.D.
1,1,1 trichloroethane	N.D.	N.D.	N.D.
trichloroethylene	N.D.	N.D.	N.D.
tetrachloroethylene	N.D.	N.D.	N.D.
trimethyl silanol	N.D.	N.D.	N.D.

INTER-OFFICE CORRESPONDENCE

SWS Silicones Corporation

To G. C. Philbrook

Date December 2, 1983

Copy to L. B. Bruner
J. Calamungi
B. P. Dennis
G. L. Ford
B. McClellen
T. J. Sayers
G. R. Wolf

From S. L. Compton

Subject SWS TEST WELL WATER RESULTS

E&E on 9/27/83

Six filtered and unfiltered SWS test well water samples, collected on October 14, 1983, were analyzed for the 13 total priority metals. The results are as follows:

Metal mg/l	POND 1S Well(U)	POND 1S Well(F)	DRUM M-1 Well(U)	DRUM M-1 Well(F)	DRUM M-4 Well(U)	DRUM M-4 Well(F)
1. Antimony	0.05	<0.01	<0.01	<0.01	<0.01	<0.01
2. Arsenic	<0.04	<0.04	<0.004	<0.004	0.004	<0.004
3. Beryllium	0.01	<0.01	<0.01	<0.01	<0.01	0.01
Cadmium	0.014	<0.001	0.003	0.004	0.005	<0.001
5. Chromium	0.14	<0.01	<0.01	0.01	<0.01	<0.01
6. Copper	3.69	0.008	0.015	0.015	0.026	0.012
7. Lead	0.24	0.003	0.013	0.002	0.016	0.004
8. Mercury	0.0004	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004
9. Nickel	0.33	0.009	0.006	0.001	0.009	0.007
10. Selenium	<0.02	<0.002	<0.004	<0.004	<0.01	<0.004
11. Silver	0.023	0.006	<0.005	<0.005	<0.005	0.007
12. Thallium	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
13. Zinc	2.13	0.029	0.048	0.026	0.061	0.032

(U) = unfiltered and containing nitric acid preservative
(F) = filtered prior to addition of nitric acid preservative

Analyses clearly indicate a reduction in some of the metal concentrations following sample filtration.

The filtration removes insoluble material. The contamination (insoluble material) results from bailing the wells prior to sampling.

Samuel L. Compton

Samuel L. Compton

SLC:jj

0032-095-02A (2/75)

DEC 6 1983

G. Philbrook

POND

E&E on 9/27/83

SWS SILICONES CORPORATION
Laboratory Testing - October 14, 1983
JONES & HENRY LABORATORIES, INC.

SWS Sample Identification: 63900
JHL Sample Number: 8310-201

IS Wall unfiltered

TEST PARAMETER	CONCENTRATION (mg/l)
Antimony	0.05
Arsenic	< 0.04
Beryllium	0.01
Cadmium	0.014
Chromium	0.14
Copper	3.69
Lead	0.24
Mercury	0.0004
Nickel	0.33
Selenium	< 0.02
Silver	0.023
Thallium	< 0.1
Zinc	2.13

LT - Actual value less than stated level of detection

Please advise should you have questions concerning these data.

POND

SWS SILICONES CORPORATION
Laboratory Testing - October 14, 1983
JONES & HENRY LABORATORIES, INC.

SWS Sample Identification: 63903
JHL Sample Number: 8310-204

15 well Filtered

TEST PARAMETER	CONCENTRATION (mg/l)
Antimony	< 0.01
Arsenic	< 0.04
Beryllium	< 0.01
Cadmium	< 0.001
Chromium	< 0.01
Copper	0.008
Lead	0.003
Mercury	< 0.0002
Nickel	0.009
Selenium	< 0.002
Silver	0.006
Thallium	< 0.1
Zinc	0.029

LT - Actual value less than stated level of detection

Please advise should you have questions concerning these data.

POND

G. Pilbrook

E & E

9/27/83 sample, all Unfiltered

SWS SILICONES CORPORATION
Laboratory Testing - September 29, 1983
JONES & HENRY LABORATORIES, INC.

SWS Sample Identification: Well 690
JHL Sample Number: 8309-400

IS Well

TEST PARAMETER		Concentration (mg/l)	
Antimony		0.2	
Arsenic		0.009	
Beryllium	LT	0.01	
Cadmium		0.014	✓
Chromium		0.03	
Copper		2.73	✓
Lead		0.22	✓
Mercury	LT	0.001	
Nickel		0.20	
Selenium	LT	0.015	✓
Silver		0.045	
Thallium	LT	0.1	
Zinc		1.15	✓

LT-Actual value less than stated level of detection

Please advise should you have questions concerning these data.

POND

UNFILTERED

SWS SILICONES CORPORATION
Laboratory Testing - September 29, 1983
JONES & HENRY LABORATORIES, INC.

SWS Sample Identification: Well 691
JHL Sample Number: 8309-401

IS well duplicate

TEST PARAMETER	Concentration (mg/l)
Antimony	0.3
Arsenic	0.008
Beryllium	LT 0.01
Cadmium	0.014
Chromium	0.02
Copper	1.89
Lead	0.050
Mercury	0.0005
Nickel	0.19
Selenium	LT 0.015
Silver	0.045
Thallium	LT 0.1
Zinc	1.10

LT-Actual value less than stated level of detection

Please advise should you have questions concerning these data.

POND

UNFILTERED

SWS SILICONES CORPORATION
Laboratory Testing - September 29, 1983
JONES & HENRY LABORATORIES, INC.

SWS Sample Identification: Well 693 35 well
JHL Sample Number: 8309-403

TEST PARAMETER		Concentration (mg/l)
Antimony		0.08
Arsenic		0.016
Beryllium	LT	0.01
Cadmium		0.001
Chromium		0.085 ✓
Copper		0.154
Lead		0.025
Mercury		0.0005
Nickel		0.070
Selenium	LT	0.015
Silver		0.016
Thallium	LT	0.1
Zinc		0.408

LT-Actual value less than stated level of detection

Please advise should you have questions concerning these data.

POND

UNFILTERED

SWS SILICONES CORPORATION
Laboratory Testing - September 29, 1983
JONES & HENRY LABORATORIES, INC.

3 D well

SWS Sample Identification: Well 694
JHL Sample Number: 8309-404

TEST PARAMETER		Concentration (mg/l)	
Antimony		0.1	
Arsenic	LT	0.002	
Beryllium	LT	0.01	
Cadmium		0.005	
Chromium		0.09	✓
Copper		0.161	
Lead		0.075	✓
Mercury	LT	0.0002	
Nickel		0.26	
Selenium	LT	0.015	✓
Silver		0.012	
Thallium	LT	0.1	
Zinc		0.600	

LT-Actual value less than stated level of detection

Please advise should you have questions concerning these data.

PAD

UNFILTERED

SWS SILICONES CORPORATION
Laboratory Testing - September 29, 1983
JONES & HENRY LABORATORIES, INC.

SWS Sample Identification: Well 696 (45 well)
JHL Sample Number: 8309--406

TEST PARAMETER		Concentration (mg/l)
Antimony		0.02
Arsenic		0.027
Beryllium	LT	0.01
Cadmium		0.004
Chromium		0.04
Copper		0.065
Lead		0.031
Mercury	LT	0.0002
Nickel		0.082
Selenium	LT	0.015 ✓
Silver		0.013
Thallium	LT	0.1
Zinc		0.161

LT-Actual value less than stated level of detection

Please advise should you have questions concerning these data.

POND UNFILTERED

SWS SILICONES CORPORATION
Laboratory Testing - September 29, 1983
JONES & HENRY LABORATORIES, INC.

4D well

SWS Sample Identification: Well 697
JHL Sample Number: 8309-407

TEST PARAMETER		Concentration (mg/l)	
Antimony		0.02	
Arsenic		0.029	
Beryllium	LT	0.01	
Cadmium		0.008	
Chromium		0.095	✓
Copper		0.136	
Lead		0.065	✓
Mercury	LT	0.0002	
Nickel		0.12	
Selenium	LT	0.010	
Silver		0.023	
Thallium	LT	0.1	
Zinc		0.428	

LT-Actual value less than stated level of detection

Please advise should you have questions concerning these data.